WHAT IS CLAIMED IS:

1.   A method of extracting a region of interest from continuous frames of cross sectional images of an organism, the continuous frames including a first frame, a second frame that is next to the first frame, a

5   third frame that is next to the second frame, and onward frames that are after the third frame, comprising:

    calculating an initial judgment criterion for the region of interest in the first frame;

    a first judging of judging whether a specific region in the second

10   frame is any one of inside and outside of the region of interest based on the initial judgment criterion and values of pixels in the specific region; and

    a second judging of judging whether a specific region in the third frame and in the onward frames is any one of inside and outside of the

15   region of interest based on values of pixels of regions that have been judged to be inside the region of interest in the previous frame.

2.   The method according to claim 1, wherein the first frame is either of one frame and a plurality of frames, and

20   the calculating includes setting a dummy region of interest by manual operation, and calculating the initial judgment criterion based on the dummy region.

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3.   The method according to claim 1, wherein the first judging and the second judging includes

setting a temporary region of interest in the frame under consideration at a position that is same as the region of interest in a

5   frame previous to the frame under consideration, and

judging whether each pixel that is adjacent to a boundary of the temporary region of interest is any one of inside and outside of the region of interest.

10   4.   The method according to claim 3, wherein the judging includes

expanding the region of interest with respect to the region of interest of the previous frame, when a pixel to be allocated to the region of interest is outside of the temporary region, to thereby include the pixel under consideration inside of the region of interest in the frame under

15   consideration, and

contracting the region of interest with respect to the region of interest of the previous frame, when a pixel not to be allocated to the region of interest is inside of the temporary region, to thereby not include the pixel under consideration inside of the region of interest in the frame

20   under consideration.

5.   The method according to claim 1, wherein in judgment of allocation of the frame continuing with the part of the continuous frames and the frame from the frame that is in continuity with the frame onward,

25   the frames from among a plurality of continuous frames from the frame

previous to the one that is to be judged are made to correspond with the pixel unit and while acquiring a local region of prescribed size including each pixel of the frame that is to be judged, the judgment criterion set for the part of the region of interest including the local region is used at the

5   second step.

6.   The method according to claim 1, further comprising storing values of pixels of the region of interest whereby the values of pixels can be displayed.

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7.   A method of extracting a region of interest from continuous frames of cross sectional images of an organism, the continuous frames including a first frame, a second frame that is next to the first frame, a third frame that is next to the second frame, and onward frames that are

15   next to the third frame, comprising:

calculating a first initial judgment criteria and a second initial judgment criteria, wherein the first initial judgment criteria is for judging whether a specific region in the first frame is inside of the region of interest, and the second initial judgment criteria is for judging whether a

20   specific region in the first frame is outside of the region of interest;

a first judging of judging whether a specific region in the second frame is any one of inside and outside of the region of interest based on the first judgment criteria, the second judgment criteria, and values of pixels in the specific region; and

25   a second judging of judging whether a specific region in the third

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frame and in the onward frames is any one of inside and outside of the region of interest based on values of pixels that have been allocated to inside of the region of interest and a values of pixels that have been judged to be inside the region of interest and values of pixels that have

5   been judged to be outside the region of interest in the previous frame.

8.   The method according to claim 7, wherein the first frame is either of one frame and a plurality of frames, and

the calculating includes setting a dummy region of interest by

10   manual operation, and calculating the initial judgment criterion based on the dummy region.

9.   The method according to claim 7, wherein the first judging and the second judging includes

15   setting a temporary region of interest in the frame under consideration at a position that is same as the region of interest in a frame previous to the frame under consideration, and

judging whether each pixel that is adjacent to a boundary of the temporary region of interest is any one of inside and outside of the region

20   of interest.

10.   The method according to claim 9, wherein the judging includes expanding the region of interest with respect to the region of interest of the previous frame, when a pixel to be allocated to the region

25   of interest is outside of the temporary region, to thereby include the pixel

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under consideration inside of the region of interest in the frame under consideration, and

contracting the region of interest with respect to the region of interest of the previous frame, when a pixel not to be allocated to the

5   region of interest is inside of the temporary region, to thereby not include the pixel under consideration inside of the region of interest in the frame under consideration.

11.   The method according to claim 7, wherein in judgment of

10   allocation of the frame continuing with the part of the continuous frames and the frame from the frame that is in continuity with the frame onward, the frames from among a plurality of continuous frames from the frame previous to the one that is to be judged are made to correspond with the pixel unit and while acquiring a local region of prescribed size including

15   each pixel of the frame that is to be judged, the judgment criterion set for the part of the region of interest including the local region is used at the second step.

12.   The method according to claim 7, further comprising storing

20   values of pixels of the region of interest whereby the values of pixels can be displayed.

13.   A computer program that makes a computer execute extraction of a region of interest from continuous frames of cross sectional images of

25   an organism, the continuous frames including a first frame, a second

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frame that is next to the first frame, a third frame that is next to the

second frame, and onward frames that are after the third frame,

comprising:

calculating an initial judgment criterion for the region of interest in

5   the first frame;

a first judging of judging whether a specific region in the second

frame is any one of inside and outside of the region of interest based on

the initial judgment criterion and values of pixels in the specific region;

and

10   a second judging of judging whether a specific region in the third

frame and in the onward frames is any one of inside and outside of the

region of interest based on values of pixels of regions that have been

judged to be inside the region of interest in the previous frame.

15   14.   The computer program according to claim 13, wherein the first

frame is either of one frame and a plurality of frames, and

the calculating includes setting a dummy region of interest by

manual operation, and calculating the initial judgment criterion based on

the dummy region.

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15.   The computer program according to claim 13, wherein the first

judging and the second judging includes

setting a temporary region of interest in the frame under

consideration at a position that is same as the region of interest in a

25   frame previous to the frame under consideration, and

judging whether each pixel that is adjacent to a boundary of the temporary region of interest is any one of inside and outside of the region of interest.

5   16.   The computer program according to claim 15, wherein the judging includes

expanding the region of interest with respect to the region of interest of the previous frame, when a pixel to be allocated to the region of interest is outside of the temporary region, to thereby include the pixel

10   under consideration inside of the region of interest in the frame under consideration, and

contracting the region of interest with respect to the region of interest of the previous frame, when a pixel not to be allocated to the region of interest is inside of the temporary region, to thereby not include

15   the pixel under consideration inside of the region of interest in the frame under consideration.

17.   The computer program according to claim 13, wherein in judgment of allocation of the frame continuing with the part of the

20   continuous frames and the frame from the frame that is in continuity with the frame onward, the frames from among a plurality of continuous frames from the frame previous to the one that is to be judged are made to correspond with the pixel unit and while acquiring a local region of prescribed size including each pixel of the frame that is to be judged, the

25   judgment criterion set for the part of the region of interest including the

local region is used at the second step.

18.   The computer program according to claim 13, further comprising storing values of pixels of the region of interest whereby the values of
5   pixels can be displayed.

19.   A computer program that makes a computer execute extraction of a region of interest from continuous frames of cross sectional images of an organism, the continuous frames including a first frame, a second
10   frame that is next to the first frame, a third frame that is next to the second frame, and onward frames that are next to the third frame, comprising:
        calculating a first initial judgment criteria and a second initial judgment criteria, wherein the first initial judgment criteria is for judging
15   whether a specific region in the first frame is inside of the region of interest, and the second initial judgment criteria for judging whether a specific region in the first frame is outside of the region of interest;
        a first judging of judging whether a specific region in the second frame is any one of inside and outside of the region of interest based on
20   the first judgment criteria, the second judgment criteria, and values of pixels in the specific region; and
        a second judging of judging whether a specific region in the third frame and in the onward frames is any one of inside and outside of the region of interest based on values of pixels that have been allocated to
25   inside of the region of interest and a values of pixels that have been

judged to be inside the region of interest and values of pixels that have been judged to be outside the region of interest in the previous frame.

20.   The computer program according to claim 19, wherein the first frame is either of one frame and a plurality of frames, and

the calculating includes setting a dummy region of interest by manual operation, and calculating the initial judgment criterion based on the dummy region.

21.   The computer program according to claim 19, wherein the first judging and the second judging includes

setting a temporary region of interest in the frame under consideration at a position that is same as the region of interest in a frame previous to the frame under consideration, and

judging whether each pixel that is adjacent to a boundary of the temporary region of interest is any one of inside and outside of the region of interest.

22.   The computer program according to claim 21, wherein the judging includes

expanding the region of interest with respect to the region of interest of the previous frame, when a pixel to be allocated to the region of interest is outside of the temporary region, to thereby include the pixel under consideration inside of the region of interest in the frame under consideration, and

contracting the region of interest with respect to the region of interest of the previous frame, when a pixel not to be allocated to the region of interest is inside of the temporary region, to thereby not include the pixel under consideration inside of the region of interest in the frame

5   under consideration.

23.   The computer program according to claim 19, wherein in judgment of allocation of the frame continuing with the part of the continuous frames and the frame from the frame that is in continuity with

10   the frame onward, the frames from among a plurality of continuous frames from the frame previous to the one that is to be judged are made to correspond with the pixel unit and while acquiring a local region of prescribed size including each pixel of the frame that is to be judged, the judgment criterion set for the part of the region of interest including the

15   local region is used at the second step.

24.   The computer program according to claim 19, further comprising storing values of pixels of the region of interest whereby the values of pixels can be displayed.

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25.   An image processing apparatus that extracts a region of interest from continuous frames of cross sectional images of an organism, the continuous frames including a first frame, a second frame that is next to the first frame, a third frame that is next to the second frame, and onward

25   frames that are after the third frame, comprising:

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a calculating unit that calculates an initial judgment criterion for the region of interest in the first frame;

a first judging unit that judges whether a specific region in the second frame is any one of inside and outside of the region of interest based on the initial judgment criterion and values of pixels in the specific region; and

a second judging unit that judges whether a specific region in the third frame and in the onward frames is any one of inside and outside of the region of interest based on values of pixels of regions that have been judged to be inside the region of interest in the previous frame.

26.   The image processing apparatus according to claim 25, further comprising a storage unit that stores flag information indicating display target for each pixel of the region of interest.

27.   The image processing apparatus according to claim 26, further comprising a display unit that displays the region of interest based on the flag information stored by the storage unit.

28.   An image processing apparatus that extracts a region of interest from continuous frames of cross sectional images of an organism, the continuous frames including a first frame, a second frame that is next to the first frame, a third frame that is next to the second frame, and onward frames that are after the third frame, comprising:

a calculating unit that calculates a first initial judgment criteria and

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a second initial judgment criteria, wherein the first initial judgment criteria is for judging whether a specific region in the first frame is inside of the region of interest, and the second initial judgment criteria is for judging whether a specific region in the first frame is outside of the region of

5   interest;

a first judging unit that judges whether a specific region in the second frame is any one of inside and outside of the region of interest based on the first judgment criteria, the second judgment criteria, and values of pixels in the specific region; and

10   a second judging unit that judges whether a specific region in the third frame and in the onward frames is any one of inside and outside of the region of interest based on values of pixels that have been allocated to inside of the region of interest and a values of pixels that have been judged to be inside the region of interest and values of pixels that have

15   been judged to be outside the region of interest in the previous frame.

29.   The image processing apparatus according to claim 28, further comprising a storage unit that stores flag information indicating display target for each pixel of the region of interest.

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30.   The image processing apparatus according to claim 29, further comprising a display unit that displays the region of interest based on the flag information stored by the storage unit.